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MRID No.: 436491-07

DATA EVALUATION RECORD
§ 72-1(A) -- ACUTE LC_{50} TEST WITH A WARMWATER FISH

1. **CHEMICAL:** Didecyldimethylammonium-carbonate (DDA Carbonate) — PC Code No.: 069208
2. **TEST MATERIAL:** DDA Carbonate — Purity: 45.9%
   ^{14}C-DDA Chloride — 96.9%
3. **CITATION**

Author: Maura K. Collins
Title: Didecyldimethylammoniumcarbonate (DDA Carbonate) - Evaluation in a Static-Renewal Acute Toxicity Test with Bluegill Sunfish (*Lepomis macrochirus*)
Study Completion Date: June 20, 1994
Laboratory: Springborn Laboratories, Inc., Wareham, MA
Sponsor: Lonza Inc., Fair Lawn, NJ
Laboratory Report ID: 94-5-5259
MRID No.: 436491-07
DP Barcode: D218362

4. **REVIEWED BY:** Max A. Feken, M.S., Environmental Toxicologist, KBN Engineering and Applied Sciences, Inc.

Signature: Max Feken **Date:** 11/30/95

APPROVED BY: Mark Mossler, M.S., Toxicologist
KBN Engineering and Applied Sciences, Inc.

Signature: Mark Mossler **Date:** 11/30/95

5. **APPROVED BY:**

Signature: Henry T. Craven 2/6/96 **Date:** 2-6-96

6. **STUDY PARAMETERS**

Age or Size of Test Organism: 29-41 mm
Definitive Test Duration: 96 hours
Study Method: Static-Renewal
Type of Concentrations: Mean Measured

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for an acute toxicity test using bluegill sunfish. An LC_{50} value of 270 ppb ai would classify dideclyldimethylammoniumcarbonate as highly toxic to bluegill sunfish. The NOEC was determined to be 98 ppb ai.


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Results Synopsis

LC_{50}: 270 ppb ai
NOEC: 98 ppb ai
95% C.I.: 241-309 ppb ai
Probit Slope: N/A

8. **ADEQUACY OF THE STUDY**

A. Classification: Core

B. Rationale: N/A

C. Repairability: N/A

9. **GUIDELINE DEVIATIONS** The pH of the 48-hour renewed solution was higher (8.4-8.7) than recommended (7.2 to 7.6). However, the pH returned to recommended levels by the end of the test (96-hour).

10. **SUBMISSION PURPOSE:**

11. **MATERIALS AND METHODS**

A. Test Organisms

Guideline Criteria	Reported Information
Species Preferred species is the bluegill sunfish (*Lepomis macrochirus*)	*Lepomis macrochirus*
Mean Weight 0.5-5 g	0.59 g
Mean Standard Length Longest not > 2x shortest	Mean: 36 mm Range: 29-41 mm
Supplier	Bybrook Hatchery, Ashford, Connecticut
All fish from same source?	Yes
All fish from the same year class?	Not reported.

B. Source/Acclimation

Guideline Criteria	Reported Information
Acclimation Period Minimum 14 days	14 days.
Wild caught organisms were quarantined for 7 days?	N/A
Were there signs of disease or injury?	No
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	N/A
Feeding No feeding during the study	No feeding 48 hours prior to testing or during test period.
Pretest Mortality No more than 3% mortality 48 hours prior to testing	0.4% mortality 48 hours prior to testing.

C. Test System

Guideline Criteria	Reported Information
Source of dilution water Soft reconstituted water or water from a natural source, **not** dechlorinated tap water	Soft reconstituted water with total hardness of 40 mg/L as $CaCO_3$.
Does water support test animals without observable signs of stress?	Yes
Water Temperature 17°C or 22°C	20-23°C
pH Prefer 7.2 to 7.6	1st half of test: 7.4 to 7.9 2nd half of test: 7.5 to 8.7
Dissolved Oxygen Static: ≥ 60% during 1st 48 hrs and ≥ 40% during 2nd 48 hrs, flow-through: ≥ 60%	≥64% during 1st 48 hrs and ≥59% during 2nd 48 hrs
Total Hardness Prefer 40 to 48 mg/L as $CaCO_3$	40 mg/L as $CaCO_3$

Guideline Criteria	Reported Information
Test Aquaria 1. Material: Glass or stainless steel 2. Size: Volume of 19 L (5 gal) or 30 x 60 x 30 cm 3. Fill volume: 15-30 L of solution	1. Glass 2. 18.9 L 3. 15 liters
Type of Dilution System Must provide reproducible supply of toxicant	N/A
Flow Rate Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period	N/A
Biomass Loading Rate Static: ≤ 0.8 g/L at ≤ 17°C, ≤ 0.5 g/L at > 17°C; flow-through: ≤ 1 g/L/day	0.39 g/L/day
Photoperiod 16 hours light, 8 hours dark	16 hours light, 8 hours dark
Solvents Not to exceed 0.5 mL/L for static tests or 0.1 mL/L for flow-through tests	Solvent: None used Maximum conc.: N/A

D. Test Design

Guideline Criteria	Reported Information
Range Finding Test If LC_{50} >100 mg/L with 30 fish, then no definitive test is required.	Range finding test concentrations: 100, 400, and 1000, 4000, and 10,000 µg ai/L. No mortality or sublethal effects were noted at 100 µg ai/L. Total mortality at ≥400 µg ai/L.

Guideline Criteria	Reported Information
Nominal Concentrations of Definitive Test Control & 5 treatment levels; dosage should be 60% of the next highest concentration; concentrations should be in a geometric series	Nominal test concentrations for definitive study: 53, 87, 140, 240, and 400 µg ai/L. Dosage is 60% of next highest concentration. A dilution water control was also included.
Number of Test Organisms Minimum 10/level, may be divided among containers	20, 10 per replicate
Test organisms randomly or impartially assigned to test vessels?	Yes
Biological observations made every 24 hours?	Yes
Water Parameter Measurements 1. Temperature Measured constantly or, if water baths are used, every 6 hrs, may not vary > 1°C 2. DO and pH Measured at beginning of test and every 48 h in the high, medium, and low doses and in the control	1. Temperature measured constantly. 2. Yes; DO and pH measured for each treatment level and control at initiation and every 24 hours.
Chemical Analysis Needed if solutions were aerated, if chemical was volatile, insoluble, or known to absorb, if precipitate formed, if containers were not steel or glass, or if flow-through system was used	Concentrations measured at 0-hour, 48-hour (time when solutions were renewed), and 96-hour. Mean measured concentrations were 58, 98, 140, 230, and 390 µg ai/L.

12. REPORTED RESULTS

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes

Guideline Criteria	Reported Information
Recovery of Chemical	97-110%
Control Mortality Not more than 10% control organisms may die or show abnormal behavior.	0%
Raw data included?	Yes
Signs of toxicity (if any) were described?	Yes

Mortality

Concentration (ppb)		Number of Fish	Cumulative Number Dead			
			Hour of Study			
Nominal	Mean Measured		24	48	72	96
Control	N/A	20	0	0	0	0
53	58	20	0	0	0	0
87	98	20	0	0	0	0
140	140	20	1	1	1	1
240	230	20	1	2	2	2
400	390	20	20	20	20	20

Other Significant Results: No signs of toxicity (sublethal effects) were observed in fish at the 98 and 58 µg ai/L treatment levels or in the control group.

B. Statistical Results

Method: Binomial method

96-hr LC_{50}: 280 ppb ai 95% C.I.: 230-390 ppb ai

Probit Slope: N/A NOEC: 98 ppb ai

13. VERIFICATION OF STATISTICAL RESULTS

Parameter	Result
Binomial Test LC_{50} (C.I.)	283 (230-390) ppb ai
Moving Average Angle LC_{50} (95% C.I.)	270 (241-309) ppb ai
Probit LC_{50} (95% C.I.)	N/A
Probit Slope	Not determined.
NOEC	98 ppb ai

14. REVIEWER'S COMMENTS: This study is scientifically sound and fulfills the guideline requirements for an acute toxicity test using bluegill sunfish. An LC_{50} value of 270 ppb ai would classify dideclyldimethylammoniumcarbonate as highly toxic to bluegill sunfish. The NOEC was determined to be 98 ppb ai. This study is classified as **Core.**

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
390	20	20	100	9.536742E-05
230	20	2	10	2.012253E-02
140	20	1	5	2.002716E-03
98	20	0	0	9.536742E-05
58	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 230 AND 390 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 282.8375

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	6.572952E-02	270.1171	240.9739	309.3684

NO CONVERGENCE IN 25 ITERATIONS. THE PROBIT METHOD
PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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